

CLEAN VERSION OF AMENDMENTS

In the Specification:

On page 1, line 7, insert the following paragraph:

a1 This is a continuation application of copending U.S. Application No. 09/563,783, filed May 2, 2000, which is a continuation of U.S. Application No. 09/103,281, now Patent No. 6,088,019, filed June 23, 1998, the disclosures of which are incorporated herein by reference in their entireties.

In the Claims:

All pending claims are reproduced below. Claims that have been changed by this amendment are labelled as "amended."

Please cancel claims 1-37 without prejudice.

Please add the following claims:

38. (new) A haptic feedback stylus device in communication with a host computer running a host application program, the stylus device comprising:

a stylus member physically contacted by a user and to be manipulated against a surface by said user, said stylus member to be held between fingers of said user;

at least one sensor operative to detect said manipulation of said stylus member against said surface and output sensor signals representative of said manipulation to said host computer; and

a computer-controlled actuator coupled to said stylus member and operative to apply a modulated force from a tip portion of said stylus member against said surface on which said stylus is manipulated.

39. (new) A haptic feedback stylus as recited in claim 38 wherein said actuator extends a length of said stylus member by moving said tip portion against said surface.

40. (new) A haptic feedback stylus as recited in claim 38 wherein a power source for said actuator is housed within said stylus member.

41. (new) A haptic feedback stylus as recited in claim 40 wherein said power source includes a battery.

42. (new) A haptic feedback stylus as recited in claim 38 wherein said actuator can produce a plurality of force sensations, said force sensations including a vibration, a jolt, and a texture.

43. (new) A haptic feedback stylus as recited in claim 38 wherein said actuator includes a voice coil.

44. (new) A haptic feedback stylus as recited in claim 38 wherein said tip portion includes a rotatable ball.

45. (new) A haptic feedback stylus as recited in claim 44 wherein said actuator is a braking actuator that applies resistance against said rotatable ball.

46. (new) A haptic feedback stylus as recited in claim 44 wherein said braking actuator is a solenoid.

47. (new) A haptic feedback stylus as recited in claim 38 wherein said braking actuator can be pulsed at a high frequency to create a passive sensation that feels like a vibration to said user.

48. (new) A haptic feedback stylus as recited in claim 38 wherein said at least one sensor is included in said surface that can be contacted by said stylus.

49. (new) A haptic feedback interface device in communication with a host computer running a host application program, the interface device comprising:

a user manipulatable object physically contacted by a user and to be manipulated by said user, wherein said manipulation of said stylus is detectable by at least one sensor in communication with said host computer; and

a computer-controlled braking actuator coupled to said user manipulatable object and operative to apply a modulated force on said user manipulatable object, wherein said braking actuator is pulsed at a high frequency to create a passive sensation on said user manipulatable

Q

object that feels like a vibration to said user as said user manipulatable object is moved by said user.

50. (new) A haptic feedback interface device as recited in claim 49 wherein said modulated force is applied to a rotating member of said user manipulatable object.

51. (new) A haptic feedback interface device as recited in claim 50 wherein said rotating member is a rotatable ball against which a portion of said braking member is pulsed.

sub B1
52. (new) A haptic feedback interface device as recited in claim 51 wherein said user manipulatable object is an elongated stylus member held between fingers of said user, said stylus member to be manipulated against a surface by said user.

53. (new) A haptic feedback stylus as recited in claim 52 wherein said tip portion includes said ball such that said stylus can be rolled across said surface.

54. (new) A haptic feedback stylus as recited in claim 52 wherein said braking actuator is a solenoid.

Q2
55. (new) A method for providing haptic feedback to a user of a haptic feedback interface device in communication with a host computer, the method comprising:

sensing manipulation of a user manipulatable object physically contacted by a user, wherein said manipulation of said stylus is reported to said host computer; and

applying a modulated force on said user manipulatable object using a computer-controlled braking actuator coupled to said user manipulatable object, wherein said braking actuator is pulsed at a sufficiently high frequency to create a passive sensation on said user manipulatable object that feels like a vibration to said user as said user manipulatable object is moved by said user.

56. (new) A method as recited in claim 55 wherein said user manipulatable object is an elongated stylus member held between fingers of said user, wherein said stylus member is manipulated against a surface by said user.

57. (new) A method as recited in claim 56 wherein said stylus member includes a rotatable ball in a tip portion of said stylus member, wherein said braking actuator applies said modulated force to said rotatable ball while said user moves said tip portion of said stylus over said surface